User's Manual

COBHAM

The most important thing we build is trust.

Inline Camera Mount

- Broadcast Version -

100-M0058X2
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1.0 Acronyms

This section lists and describes the various acronyms used in this document.

Name	Meaning
16QAM	16-state Quadrature Amplitude Modulation
64 QAM	64-state Quadrature Amplitude Modulation
A/V	Audio/Video
C-OFDM	Coded Orthogonal Frequency Division Multiplexing
CVBS	Color video base band signal (Composite video).
Y	Luminance video
C	Chromaince video
Pr	Red Chromaince
Pb	Blue Chromaince
FEC	Forward Error Correction
MDT-B	Messenger Digital Transmitter, Broadcast Version
MPEG	Moving Picture Experts Group
NTSC	National Television System Committee
PAL	Phase Alternation Line
QPSK	Quadrature Phase Shift Keying
RF	Radio Frequency
SDI	Serial Digital Interface
TX	Transmitter

2.0 Introduction

The inline camera mount box is an optional housing (for the MDT-B transmitter) which mounts to a professional A/V camera. The housings are designed to use either Anton Bauer or IDX batteries.

The two line LCD (liquid crystal display) provides visual readouts of transmitter frequency, analog video lock status, COFDM mode, COFDM bandwidth, transmitter guard interval, forward error correction (FEC), video input type, audio status, audio gain and backlight status.

In addition the front control buttons allows the most common available options (as described later in this document) to be changed from the front panel. If necessary the transmitter can still be accessed with the use of a PC using GMS control software through the 15-pin DB connector. Refer to MDT-B operation manual (100-M0056, found on GMS web site www.gmsinc.com) for detailed description of the external control software.

3.0 Front Control Panel Operation

The front control panel consists of a two line LCD (liquid crystal display) and four control buttons, the *CTRL*, *ENTR*, ↑(up arrow), and ↓(down arrow), see figure 1. In general, the up and down arrow buttons are for selecting available options, the *CTRL* button is for moving between menus and the *ENTR* button is for saving new values (as selected with the up and down arrow buttons).

Figure 1 –Front Control Panel

3.1 Menu Structure

The overall menu structure is demonstrated as a flowchart in Figure 2. Refer to this figure as the following individual displays are explained in detail.

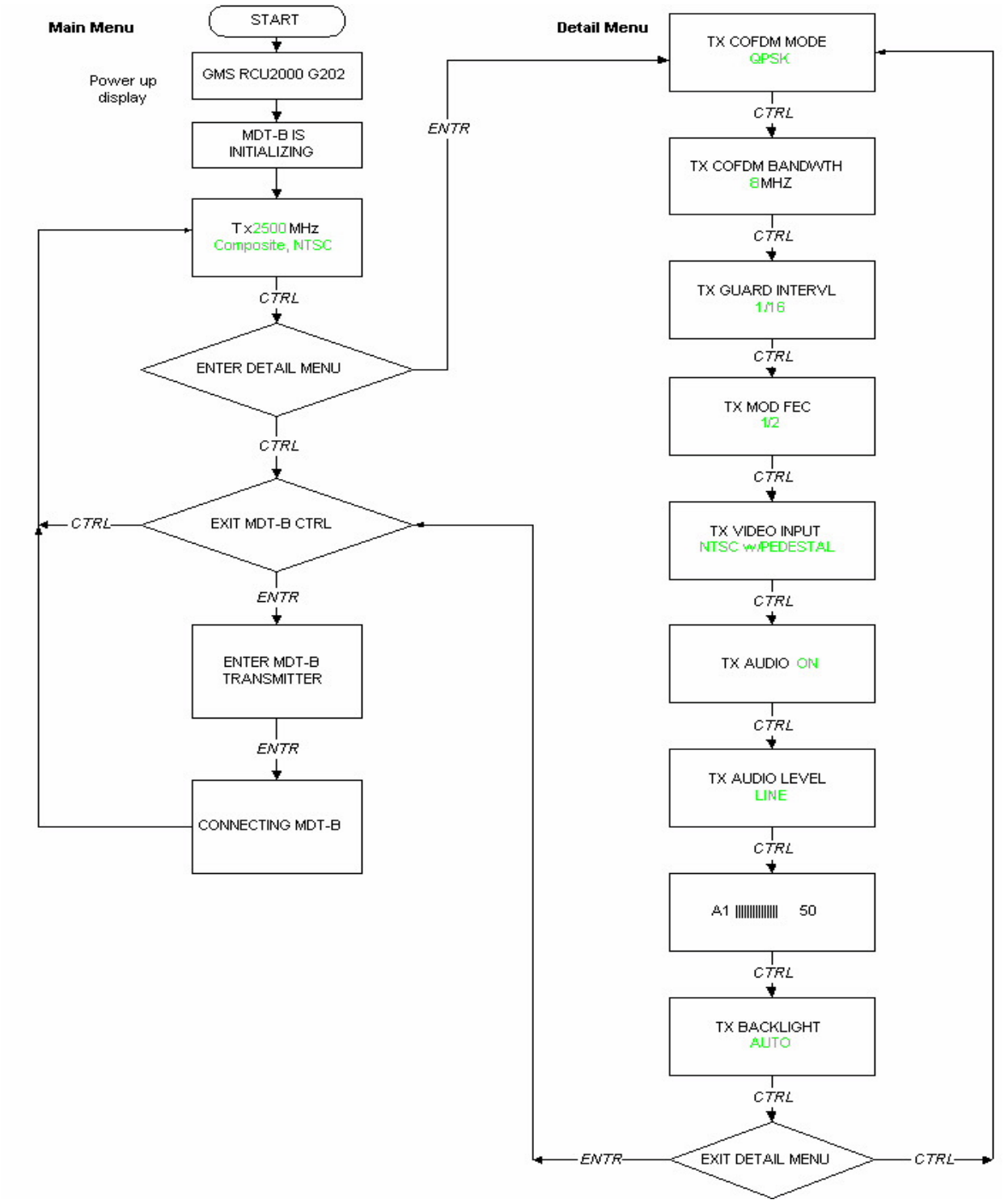
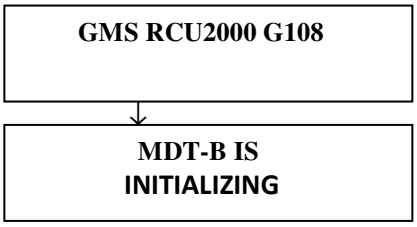


Figure 2 – Menu Flowchart

3.1.1 Power Up

On power up the LCD displays the "GMS" logo and firmware number and then the "Initializing" display appears. It takes approximately 35 seconds before communications is established for the first time on power up.



[*Note: If communications cannot be established for some reason the LOST MDT-B COMM display appears. Re-try establishing communications by pressing the ENTR button.]*

3.1.2 Main Menu

3.1.2.1 Channel Display

The CHANNEL display appears after the front panel establishes communication with the transmitter . In this mode when the ↑UP or ↓DOWN button is pressed the transmitter steps through the available channels. The display blinks for ten seconds after releasing the button. If *ENTR* button is pressed before ten seconds, the frequency changes and is stored in nonvolatile memory. If *ENTR* is not pressed before ten seconds, the display will stop blinking and the transmitter will reset to the previous frequency. In addition, on the second line of the LCD the video type and status is displayed. If no video is detected the message "NO VIDEO INPUT" is displayed. *Note: This message does not apply when the video input mode is set to SDI* .The channel display and control functions are shown below (underline words are meant to demonstrate variables which are subject to change depending on values chosen).

TX 2500 MHz **Composite, NTSC**	Channel Display with video

UP ↑	Increment channel
DOWN ↓	Decrement channel
ENTR	Saves channel
CTRL	Change to ENTER DETAIL MENU display

3.1.2.2 Enter Detail Menu Display

This display window allows user to enter a detail submenu in which variables such as COFDM mode, bandwidth guard interval, FEC (forward error correction), video input type, audio parameters and backlight options are available.

ENTER DETAIL MENU	Enter detail menu display

UP ↑	No effect
DOWN ↓	No effect
ENTR	Enters detail menu TX COFDM MODE display
CTRL	Change to EXIT MDT-B CTRL display

3.1.2.3 Exit MDT-B Control Display

This display allows user to either return to the CHANNEL display of the main menu or exit control of the MDT-B from the front LCD control panel. This is necessary when connecting to the camera mount housing through the DB-15 connector with a PC using GMS control software.

EXIT MDT-B CTRL	Exit MDT-B CTRL display

UP ↑	No effect
DOWN ↓	No effect
ENTR	Exits control of MDT-B and enters ENTER MDT-B TRANSMITTER display
CTRL	Returns to CHANNEL display

[Remember: If external PC control using GMS Control software is to be used you must first EXIT MDT-B CTRL before attempting to connect through the DB-15 connector.]

3.1.2.4 Enter MDT-B Transmitter Display

This display allows user to re-enter the CHANNEL display of the main menu and returns control to the front LCD control panel.

ENTER MDT-B TRANSMITTER

UP ↑	No effect
DOWN ↓	No effect
ENTR	Enters the CHANNEL display
CTRL	No effect

3.1.3 Detail Menu

The detail menu presents various displays for changing available options as explained in detailed below. When a new value is selected the **TX** letters in the display window will blink indicating a change is in process. It will stop blinking after the *ENTR* button is pressed (saving the new value) or exiting the display (without saving the new value) by pressing the *CTRL* button.

3.1.3.1 TX COFDM MODE display

This display allows user to choose from three available COFDM modes, QPSK, 16QAM or 64QAM.

UP ↑	Toggles between QPSK, 16QAM and 64QAM
DOWN ↓	Toggles between QPSK, 16QAM and 64QAM
ENTR	Saves new value selected
CTRL	Changes to the TX COFDM BANDWTH display

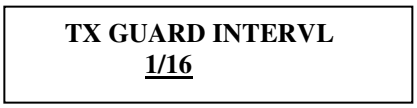
3.1.3.2 TX COFDM BANDWTH display

COFDM bandwidth can be adjusted from this display selecting from 6, 7 or 8 MHz.

UP ↑	Toggles between 6, 7 or 8 (MHz)
DOWN ↓	Toggles between 6, 7 or 8 (MHz)
ENTR	Saves new value selected
CTRL	Changes to the TX GUARD INTERVL display

3.1.3.3 TX GUARD INTERVL display

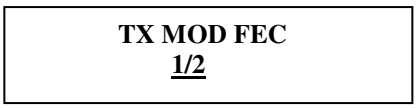
Guard interval options, 1/32, 1/16,1/8 and ¼ are selected from this display.



UP ↑	Toggles between 1/32,1/16,1/8 and 1/4
DOWN ↓	Toggles between 1/32,1/16,1/8 and 1/4
ENTR	Saves new value selected
CTRL	Changes to the TX MOD FEC display

3.1.3.4 TX MOD FEC display

FEC (Forward Error Correction) code rates, ½,2/3,3/4,5/6, and 7/8 are selected from this display.



UP ↑	Toggles between ½,2/3,3/4,5/6,7/8
DOWN ↓	Toggles between ½,2/3,3/4,5/6,7/8
ENTR	Saves new value selected
CTRL	Changes to the TX VIDEO INPUT display

3.1.3.5 TX VIDEO INPUT display

Available video input options are SDI (Serial Digital Interface), PAL, NTSC w/pedestal, NTSC, S-Video NTSC, S-Video PAL, YUV NTSC and YUV PAL. Depending on which input video type is selected the video source must be connected to the proper input connectors on the housing. See section 4.

[Note: not all input options are shown in the pull down menu boxes unless the associated encoder profile is loaded. For example if the SP@ML NTSC profile is loaded then only NTSC options appear in the pull down menu boxes].

TX VIDEO INPUT **NTSC w/PEDESTAL**

UP ↑	Toggles between SDI,PAL,NTSC with pedestal, NTSC, S-Video NTSC, S-VIDEO PAL YUV NTSC and YUV PAL
DOWN ↓	Toggles between SDI,PAL,NTSC with pedestal, NTSC, S-Video NTSC, S-VIDEO PAL YUV NTSC and YUV PAL
ENTR	Saves new value selected
CTRL	Changes to the TX AUDIO ON display

3.1.3.6 TX AUDIO ON display

This display allows user to turn audio ON or OFF.

TX AUDIO ON

UP ↑	Toggles between ON or OFF
DOWN ↓	Toggles between ON or OFF
ENTR	Saves new value selected
CTRL	Changes to the TX AUDIO LEVEL display

3.1.3.7 TX AUDIO LEVEL display

The transmitter can accept balanced audio mic or line level. This display allows user to switch between mic or line level.

UP ↑	Toggles between MIC or LINE
DOWN ↓	Toggles between MIC or LINE
ENTR	Saves new value selected
CTRL	Changes to the TX AUDIO GAIN ADJUST display

3.1.3.8 TX AUDIO GAIN ADJUST display

The audio gain can be adjusted with the ↑*UP* and ↓*DOWN* buttons. When adjusting the level the A1 letters on the left side will blink indicating that a change is in progress. If *ENTR* button is pressed the gain setting is stored. If *CTRL* button is pressed before *ENTR* the audio will reset to the previous level and the display changes to the TX BACKLIGHT display.

UP ↑	Increase audio gain
DOWN ↓	Decreases audio gain
ENTR	Saves gain level selected
CTRL	Changes to TX BACKLIGHT display

3.1.3.9 TX BACKLIGHT display

The backlight on the LCD display can be set to AUTO or ON. AUTO mode will activate when a control panel button is activated (any button) and will stay on for approximately 5 minutes. After 5 minutes the backlight will shut down until a control panel button is activated once again. ON mode will leave the backlight always turned on.

UP ↑	Toggles between AUTO or ON
DOWN ↓	Toggles between AUTO or ON
ENTR	Saves new value selected
CTRL	Changes to EXIT DETAIL MENU display

3.1.3.10 EXIT DETAIL MENU display

Allows user to exit to Main Menu or to return to beginning of Detail Menu.

EXIT DETAIL MENU

UP ↑	No effect
DOWN ↓	No effect
ENTR	Returns to EXIT MDT-B CTRL display of Main Menu
CTRL	Returns to TX COFDM MODE display, beginning of Detail Menu.

4.0 Connectors/PWR Switch and LCD Control Panel

There are four BNC connectors, two audio XLR, one DB-15 connector, one N type connector and one rocker on/off power switch located on the MDT-B inline camera unit for interfacing the RF, audio, video, power and RS-232 signals.

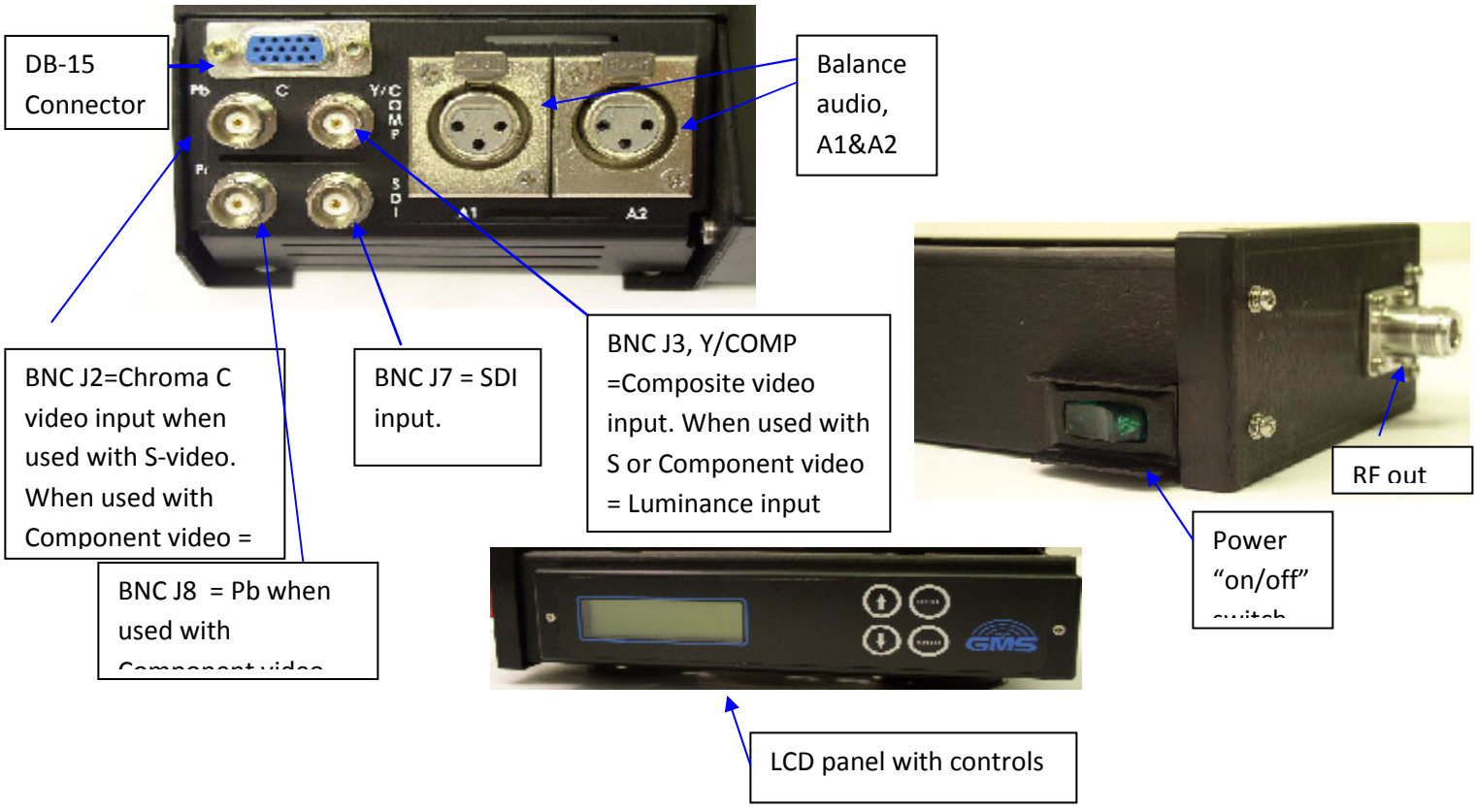

DB-15 Connector
Balance audio, A1&A2
BNC J2=Chroma C video input when used with S-video. When used with Component video =
BNC J7 = SDI input.
BNC J3, Y/COMP =Composite video input. When used with S or Component video = Luminance input
RF out
Power "on/off"
BNC J8 = Pb when used with
LCD panel with controls

Figure 3 - MDT-B Inline Camera Unit

4.1 RF Output

The MDT inline camera enclosure uses a female N type connector (flange mount) for its 'RF Output' port.

4.2 I/O

The 'I/O' connector is a female, DB-15. It is used to provide the interface for RS-232 signals (control and monitoring). GMS MDLB Configurator software program makes use of the RS232 control lines, pins 2, 3 and 5 of the DB-15 connector. The RS-232 channel utilizes a 3-wire configuration. The pin out for I/O connector is shown in Table 2.
A USB connector is currently provided with the external serial cable which is an alternate method of interfacing to the PC if DB-9 connectors are not available.

Table 1 - I/O DB-15 Connector Pin Out

Pin	Signal	Notes
1	+12Vdc	
2	RS232-Rx (CTRL)	Relative to MDT (i.e., control data is input on this pin)
3	RS232-Tx (CTRL)	Relative to MDT (i.e., control data is output on this pin)
4	Not connected	
5	RS232-GND	Common ground for both RS232 Data and Control lines
6	I^2C_D	
7	I^2C_C	
8	USB Reset	*+5Vdc*
9	USB Data -	
10	USB Data +	
11	USB GND	
12	Not connected	
13	RS232-Tx (DATA)	*Under development/for future updates*
14	RS232-Rx (DATA)	*Under development*
15	RS232-GND	*Under development*

4.3 Video Input

The MDT–B inline camera enclosure uses female BNC connectors for video input. Component, Composite or S-Video input is accepted (see section 3.1.3.5 for setting video input type). J3 BNC connector marked "Y/COMP" is a dual use input connector; a) Composite Video or b) Luminance when used with Component video. J2 BNC connector marked "C/Pr" is a dual use input connector; a) Chroma when used with S-Video or b) Pr, the red component minus the luminance information used with Component Video. J8 BNC connector marked "Pb" is the blue component minus the luminance information used with Component Video.

4.4 Power Switch

An LED indicator rocker switch is provided for controlling power to the unit.

4.5 LCD Display

Many of the control functions which are normally handled through the software interface and a PC are accessed directly with the front control panel and displayed on the LCD.

4.6 SDI Input (optional)

A BNC connector is provided for Serial Digital Interface input data stream.